

REMARKS

In order to more particularly point out and distinctly claim the subject matter which Applicants regard as the invention, the claims have been amended to state that the tobacco smoke filter has an extended life. Additionally, newly presented Claims 46-48 are directed to preferred embodiments of the present invention specifically exemplified as Sample Nos. 11, 12 and 15 in Table 3 of the specification. No new matter has been added.

Claims 1, 27-32, 34 and 38-45 have been rejected under 35 USC 103(a) as being unpatentable over Keith II et al in view of Crooks et al and Frund. Applicants respectfully traverse this ground of rejection and urge reconsideration in light of the following comments.

The presently claimed invention is directed to a tobacco smoke filter having an extended life and including activated carbon impregnated with a metal impregnant, wherein the activated carbon is high-activity activated carbon having an activity of greater than 90% CTC prior to impregnation and substantially all of the activated carbon is of a particle size between 0.6 mm and 0.212 mm.

As discussed previously, the instant invention is based on the discovery that a tobacco smoke filter made of activated carbon having an activity of greater than 90% CTC prior to impregnation and having a particle size of between 0.6 to 0.212 mm and which is then impregnated with a metal impregnant unexpectedly exhibits a high selectivity with respect to the removal of hydrogen cyanide from tobacco smoke and yet does not show a marked decrease in performance although it contains a lower level of metal impregnation. That is, the tobacco smoke filter of the present invention has an unexpectedly high efficiency of removal of undesirable vapor phase components as well as reduction in hydrogen cyanide. As will be discussed below, the advantages of the presently claimed invention clearly are unexpected in light of the prior art cited by the

Examiner and establishes the patentability of the presently claimed invention thereover.

The Keith II et al reference is directed to a process of impregnating adsorbent materials with metal oxides and discloses cigarette filters which are impregnated with about 0.5 to 13% by weight and more preferably, 4 to 6% by weight of an oxide of a metal selected from the group consisting of cobalt, copper and zinc. As admitted by the Examiner, there is no disclosure in this reference with respect to the activated carbon of Keith et al specifically disclosing an activity of greater than 90% CTC prior to impregnation as required by the currently presented claims. The Examiner also states that Applicant appears to be arguing the reference separately as he has admitted on the record that Keith II et al does not disclose the activity claimed. However, since Keith II et al is the primary reference cited by the Examiner and the reference closest to the presently claimed invention, it is only necessary for Applicants to show unexpected results as compared to this reference. The Examiner is combining Keith II et al with two other references and there is no way that Applicants can show unexpected results over Keith II et al combined with Crooks et al and Frund since each of these references only disclose a part of the present invention and are pieced together to show the invention as a whole. As will be discussed below, the test data of record in the present application clearly is sufficient to establish the patentability of the presently claimed invention.

Crooks et al is directed to a filter element incorporating an adsorbent material therein. This reference has been cited by the Examiner as disclosing a cigarette filter that includes activated carbon that is impregnated with metals with the activated carbon typically having an activity of from about 60 to about 150 CTC activity. However, as pointed out previously, this reference does not disclose any advantage to an activated carbon having an activity of greater than 90% CTC and, in fact, all of the specifically exemplified

activated carbons in this reference have a CTC of 85%. Therefore, this reference does not have any disclosure with respect to the presently claimed invention which requires a high activity activated carbon of a specified mesh size together with a specified amount of metal impregnant that has an unexpected remarkable selectivity for hydrogen cyanide in a tobacco filter, a high removal of undesirable vapor phase components and an unexpectedly long shelf life.

Frund is directed to a respiratory filter system used in filtering toxic agents, including organic vapors, acid gases, formaldehyde, ammonia, methylamine and pesticides. This reference has been cited by the Examiner as teaching the use of impregnated activated carbon to adsorb or treat gases containing harmful chemicals. However, this reference is only cumulative to the primary Keith II et al reference and, therefore, adds nothing to the combination of Keith II et al and Crooks et al.

As pointed out previously, there is objective test data of record in the present application which is more than sufficient to establish the patentability of the presently claimed invention over the prior art cited by the Examiner.

In Table 1 on page 9 of the present specification, comparative impregnated commercial carbons were examined for the removal of hydrogen cyanide and undesirable vapor phase component removal. As shown in Table 1, the standard cigarette filter which included an unimpregnated activated carbon had a vapor phase component reduction of 55% and a hydrogen cyanide reduction of 44%. In contrast thereto, in Table 3 on page 11 of the present specification, Sample Nos. 1, 2, 9 and 10 all fall within the scope of Keith II et al in that they disclose an activated carbon impregnated with copper and molybdenum. As can be seen by the results for the vapor phase component reduction percent and hydrogen cyanide reduction percent, none of these comparable samples had both a high vapor phase reduction and hydrogen cyanide reduction as achieved by the samples according to the present invention.

That is, Sample Nos. 5-8 and 11-16 all showed both superior vapor phase reduction in combination with hydrogen cyanide reduction as compared to the samples corresponding to Keith II et al. Moreover, newly presented Claims 46-48 correspond to Sample Nos. 11, 12 and 15 which even show unexpectedly superior properties over other Examples of the present invention. As such, not only is the patentability of the presently claimed invention established over the prior art cited by the Examiner, the patentability of Claims 46-48 is even further established.

The Examiner is respectfully requested to reconsider the present application and to pass it to issue.

Respectfully submitted,

  
Terryence F. Chapman

TFC/smd

FLYNN, THIEL, BOUTELL  
& TANIS, P.C.  
2026 Rambling Road  
Kalamazoo, MI 49008-1631  
Phone: (269) 381-1156  
Fax: (269) 381-5465

Terryence F. Chapman	Reg. No. 32 549
Mark L. Maki	Reg. No. 36 589
Liane L. Churney	Reg. No. 40 694
Brian R. Tumm	Reg. No. 36 328
Heon Jekal	Reg. No. 64 219
Eugene J. Rath III	Reg. No. 42 094
Dale H. Thiel	Reg. No. 24 323
David G. Boutell	Reg. No. 25 072
Sidney B. Williams, Jr.	Reg. No. 24 949

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